

CLAIMS

1. A method of incubating a liquid, the method comprising depositing the liquid on a sample-receiving portion of an inner surface
5 of a vessel, and
applying heat to the vessel to create a temperature gradient along the inner surface of the vessel such that the sample-receiving portion of the inner surface of the vessel is at a lower temperature than substantially all other portions of the inner surface of the vessel.
- 10 2. The method of claim 1, wherein depositing the liquid comprises depositing about 0.5 microliters (μ l) to about 100 (μ l) of the liquid to be incubated.
3. The method of claim 1, wherein depositing the liquid comprises depositing a quantity of glycoprotein and a chemical reagent capable of reacting with said glycoprotein to cleave oligosaccharide moities.
- 15 4. The method of claim 1, wherein applying heat to the vessel comprises applying heat to a portion of the vessel that is remote from the sample-receiving portion.
5. The method of claim 1, further comprising coupling the vessel to a holder prior to applying heat.
- 20 6. The method of claim 5, wherein the holder comprises a mass of material with an opening therethrough and coupling the vessel to the holder comprises inserting the vessel into the opening so that a first portion of the vessel extends beyond a first side of the mass of material and so that a second portion of the vessel extends beyond a second side of the mass of material.
- 25 7. The method of claim 6, further comprising placing the mass of material in a bath of water so that the first portion of the vessel is in contact with the water and so that the sample-receiving portion with the liquid deposited thereon is not in contact with the water and applying heat to the vessel comprises heating the water.
8. The method of claim 1, wherein applying heat to the vessel
30 comprises contacting a portion of the vessel with water in a heated water bath.

9. The method of claim 1, wherein the vessel comprises a sealable vial and the sample-receiving portion comprises a concave surface of the vial that is opposite an open end of the vial.

10. The method of claim 1, wherein the sample-receiving portion
5 comprises a rounded apex of a substantially conical surface.

11. The method of claim 1, further comprising orienting the vessel such that the sample-receiving portion faces downwardly with the liquid adhering thereto.

12. The method of claim 11, wherein a gas is formed in a space in
10 the vessel beneath the liquid as a result of heat being applied to a surface of the vessel below and remote from the sample-receiving portion.

13. A method of incubating a liquid, the method comprising
depositing the liquid to be incubated in a vial having a body with an
open first end and a closed second end,
15 closing the open first end of the body with a closure member,
inverting the vial so that the closed second end of the body is above the
closure member and so that at least a substantial portion of the liquid adheres to an
inner surface of the closed second end of the body, and

heating at least a portion of the vial, including heating the first end of
20 the body, so that a portion of the liquid in the vial forms a gas underneath the portion
of liquid that adheres to the inner surface of the closed second end of the body.

14. The method of claim 13, wherein closing the open first end of
the body with a closure member comprises attaching a friction-fitting lid to the first
end of the body.

25 15. The method of claim 13, wherein depositing the liquid to be
incubated comprises depositing about 0.5 microliters (μl) to about 100 (μl) of the
liquid to be incubated.

16. The method of claim 13, wherein depositing the liquid to be
incubated comprises depositing a quantity of glycoprotein and a chemical reagent
30 capable of reacting with said glycoprotein to cleave oligosaccharide moities.

17. The method of claim 13, wherein heating at least a portion of the vial comprises applying heat to a lower portion of the vial that is remote from the sample-receiving portion.

5 18. The method of claim 13, further comprising coupling the vial to a holder prior to heating.

19. The method of claim 18, wherein the holder comprises a mass of material with an opening therethrough and coupling the vial to the holder comprises inserting the vial through the opening so that the first end of the vial is situated on one side of the mass of material and so that the second end of the vial is
10 situated on an opposite side of the mass of material.

20. The method of claim 19, further comprising placing the mass of material in a bath of water so that the first end of the vial is in contact with the water and so that the liquid to be incubated is situated above the water and heating at least a portion of the vial comprises heating the water.

15 21. The method of claim 13, wherein heating at least a portion of the vial comprises contacting a portion of the vial with a heated water bath.

22. The method of claim 13, wherein depositing the liquid to be incubated comprises depositing the liquid to be incubated on a concave surface of the vial.

20 23. The method of claim 13, wherein depositing the liquid to be incubated comprises depositing the liquid to be incubated on a rounded apex of a substantially conical surface of the vial.

24. The method of claim 13, wherein heating at least a portion of the vial comprises heating the entire vial.

25 25. The method of claim 13, wherein heating at least a portion of the vial comprises submerging the entire vial in a heated water bath.

26. An apparatus for incubating a liquid reaction mixture, the apparatus comprising

30 a bath containing a heated fluid,

a holder, and

a vessel coupled to the holder, the vessel having a first portion in contact with the heated fluid and a second portion not in contact with the heated fluid,

the second portion having an inner surface including a sample-receiving region on which a volume of the liquid reaction mixture is placed for incubation, a temperature of the sample-receiving region during incubation being cooler than other areas of the inner surface of the second portion and cooler than the first portion.

5 27. The apparatus of claim 26, wherein the second portion is situated vertically above the first portion when the first portion is in contact with the heated fluid during incubation.

 28. The apparatus of claim 26, wherein the holder comprises a mass of material having an opening therethrough and the vessel is inserted into the
10 opening to couple the vessel to the holder.

 29. The apparatus of claim 28, wherein the mass of material floats on the heated fluid.

 30. The apparatus of claim 26, wherein the sample-receiving region comprises a concave portion of the inner surface.

15 31. The apparatus of claim 26, wherein the sample-receiving region comprises a rounded apex of a substantially conical portion of the inner surface.

 32. The apparatus of claim 26, wherein the vessel is made of a material to which the volume of liquid reaction mixture adheres when the vessel is oriented so that the sample-receiving region is above the liquid reaction mixture.

20 33. The apparatus of claim 26, wherein the vessel comprises a body having an opening and a closure member that closes the opening to prevent condensable vapor outside the vessel from entering the vessel during incubation.

 34. The apparatus of claim 26, wherein the heated fluid comprises a liquid.

25 35. An apparatus for incubating a liquid reaction mixture, the apparatus comprising

 a bath containing a heated liquid,

 a holder floating in the heated liquid, and

 a vessel coupled to the holder, the vessel having a first portion in
30 contact with the heated liquid and a second portion that is not in contact with the heated liquid, the second portion having an inner surface including a sample-receiving region on which the a volume of the liquid reaction mixture is placed for incubation,

the sample-receiving region being an uppermost area of the inner surface, at least part of the sample-receiving region facing downwardly toward the first portion of the vessel, and the vessel being made from a material to which the volume of the liquid reaction mixture adheres when placed on the sample-receiving region to prevent the
5 volume of the liquid reaction mixture from falling off of the sample-receiving region during incubation.

36. The apparatus of claim 35, wherein the holder comprises a mass of material having an opening therethrough and the vessel is inserted into the opening to couple the vessel to the holder.

10 37. The apparatus of claim 35, wherein the sample-receiving region comprises a concave portion of the inner surface.

38. The apparatus of claim 35, wherein the sample-receiving region comprises a rounded apex of a substantially conical portion of the inner surface.

15 39. The apparatus of claim 35, wherein the vessel comprises a body having an opening and a closure member that closes the opening to prevent condensable vapor outside the vessel from entering the vessel during incubation.

40. A method of incubating a liquid, the method comprising depositing the liquid on a sample-receiving portion of an inner surface in an interior region of a vessel,

20 orienting the vessel so that the sample receiving-portion of the inner surface of the vessel is situated above the interior region of the vessel and has at least a substantial portion of the liquid adhered thereto, and

heating at least a portion of the vessel to promote a chemical reaction in the liquid.

25 41. The method of claim 40, wherein heating at least a portion of the vessel comprises heating the entire vessel.